

WHAT IS CLAIMED IS:

- 1 1. A prism system arranged for splitting/combining different colors of light comprising:
 - 2 a first prism element having a face for projecting and receiving a first color of light;
 - 3 a first surface supported substantially parallel and spaced to form an air gap having a
 - 4 length A_1 from said face of said first prism;
 - 5 a first light path through said prism system for said first color having a glass path length
 - 6 G_1 through said prism system such that the total path length "T" for said first color is equal to the
 - 7 length of the air gap A_1 plus the glass path length G_1 (i.e., $T=A_1+G_1$);
 - 8 another prism element having a face for projecting and receiving another color of light;
 - 9 another surface supported substantially parallel and spaced to form an air gap having a
 - 10 length A_2 from said face of said another prism element; and
 - 11 another path through said prism system for said another color having a glass path length
 - 12 G_2 that is different from glass path length G_1 , glass path length G_2 selected such that the total
 - 13 path length T for said another color is the same as the total path length T of said first color (i.e.,
 - 14 $A_2+G_2=T=A_1+G_1$.
- 1 2. The prism system of claim 1 wherein said another glass path length G_2 is longer than the
- 2 length G_1 of said first glass path.
- 1 3. The prism system of claim 2 wherein an increase in the length of said glass path of said
- 2 another element results in an increase in the size of said light receiving face of said another
- 3 element.

1 4. The prism system of claim 1 wherein said first surface is a first imaging device for
2 providing said first color to said first prism element and said another surface is another imaging
3 device for providing said another color to said another prism element.

1 5. The prism system of claim 4 wherein said first and another imaging devices are micro
2 mirror imaging devices.

1 6. The prism system of claim 4 wherein said first and another imaging devices are liquid
2 crystal imaging devices.

1 7. The prism system of claim 1 further comprising a second prism element having a face for
2 projecting and receiving a second color of light with respect to a second surface supported
3 substantially parallel to and spaced to form an air gap having said length A_1 and a second light
4 path for said second color having said glass path length G_1 such that the total path length for said
5 first and second colors are equal.

1 8. The prism system of claim 7 wherein said first element receives blue light, said second
2 element receives green light and said another element receives red light.

1 9. A three element prism system arranged for splitting/combining three different colors of
2 light comprising:

3 first and second prism elements, each of said first and second elements having a face for
4 projecting and receiving one of a first and second color of light respectively;

5 first and second surfaces, each of said first and second surfaces supported substantially
6 parallel and spaced to form an air gap having a length A_1 from one of said faces of said first and

7 second prism elements;
8 first and second paths through said arrangement of prism for said first and second colors
9 respectively, both of said first and second paths having a glass path length G_1 through said
10 arrangement of prisms such that the total path length T of both of said first and second colors is
11 equal to the length of the air gap A_1 plus the glass path length G_1 (i.e., $T = A_1 + G_1$);
12 another prism element having a face for projecting and receiving a third color of light;
13 another surface supported substantially parallel and spaced to form an air gap having a
14 length A_2 from said face of said another prism element; and
15 another path through said prism arrangement for said third color having a glass path
16 length G_2 that is different from glass path length G_1 , glass path length G_2 selected such that the
17 total path length T for said third color is the same as the total path length T of said first and
18 second colors (i.e., $A_2 + G_2 = T = A_1 + G_1$).

1 10. The three element prism system of claim 9 wherein said another glass path length G_2 is
2 longer than the length G_1 of said first glass paths.

1 11. The three element prism system of claim 10 wherein said first element receives blue
2 light, said second element receives green light and said another element receives red light.

1 12. The three element prism system of claim 11 wherein said first element receives red light,
2 said second element receives green light and said another element receives blue light.

1 13. The three element prism system of claim 11 wherein an increase in the length of said
2 glass path of said another element results in an increase in the size of said light receiving face of
3 said another element.

1 14. The three element prism system of claim 11 wherein said glass path of said blue light is
2 comprised totally of said first element.

1 15. The three element prism system of claim 14 wherein said glass path of said green light
2 includes a portion of said path through said first element, a portion of said path through said
3 second element, and a portion of said path through said another element.

1 16. The three element prism system of claim 15 wherein said glass path of said red light
2 includes a portion of said path through said first element and a portion of said path through said
3 another element.

1 17. The three element prism system of claim 9 wherein said projection and receiving face of
2 said another element is larger than a three element prism system wherein said air gap of said
3 another element is equal to A_1 and said glass path of said another element is equal to G_1 .

1 18. The three element prism system of claim 9 wherein the overall size of said prism system
2 is smaller than a three element prism system having an air path of said another element equal to
3 A_1 and a glass path of said third element equal to G_1 .

1 19. The three element prism system of claim 11 wherein said first surface is a first imaging
2 device for providing said first color to said first prism element, said second surface is a second
3 imaging device for providing said second color to said second prism element and said another
4 surface is a third imaging device for providing said third color to said another prism element.

1 20. The three element prism system of claim 19 wherein said first, second and another
2 imaging devices are mirco mirror imaging devices.

1 21. The three element prism system of claim 19 wherein said first, second and another
2 imaging devices are liquid crystal imaging devices.

1 22. A method of projecting different color images to a single display surface comprising the
2 steps of:

3 spacing a first image source having a first color to form a first selected air gap having a
4 length A_1 from a receiving face of a first element of a prism system;

5 spacing another image source having another color to form a second selected air gap
6 having a length A_2 from the receiving face of another element of said prism system;

7 transmitting light from said first image source along a first path within said prism system
8 toward said display surface, said first path having a glass path length G_1 ;

9 transmitting light from said another image source along another path toward said display
10 surface, said another path having a first portion in said first element of said prism system and
11 another portion in said another element of said prism system, said another path having a glass
12 path length G_2 , said glass path length G_2 different than said glass path length G_1 ; and

13 adjusting said air gap length A_2 such that A_2 plus said glass path length G_2 is equal to said
14 air gap length A_1 plus said glass path length G_1 .

1 23. The method of claim 22 further comprising the steps of:

2 spacing a second image source having a second color from a receiving face of a second
3 element to form an air gap having said length A_1 ; and

4 transmitting light from said second source along a second path through said prism system
5 toward said display surface, said second path having said glass path length G_1 .

1 24. The method of claim 23 wherein said first color is blue, said second color is green, and
2 said another color is red.

1 25. The method of claim 24 wherein said path length G_2 is greater than path length G_1 .

1 26. A method of projecting different color images to a single display surface comprising the
2 steps of:

3 spacing a first image source having a first color and a second image source having a
4 second color to form a first selected air gap having a length A_1 from a receiving face of first and
5 second elements respectively, of a three element prism system;

6 spacing another image source having another color to form a second selected air gap
7 having a length A_2 from the receiving face of another element of said three element prism
8 system;

9 transmitting light from said first image source along a first path wholly within said first
10 element of said prism system toward said display surface, said first path having a glass path
11 length G_1 ;

12 transmitting light from said second source along a second path toward said display
13 surface, said second path having a first portion in said first element of said prism system, a
14 second portion in said second element of said prism system, and a third portion in said third
15 element of said prism system, said second path having said glass path length G_1 ;

16 transmitting light from said another source along another path toward said display
17 surface, said another path having a first portion in said first element of said prism system and
18 another portion in said another element of said prism system, said another path having a glass
19 path length G_2 , said glass path length G_2 different than said glass path length G_1 ; and

20 adjusting said air gap length A_2 such that A_2 plus said glass path length G_2 is equal to said
21 air gap length A_1 plus said glass path length G_1 .

1 27. The method of claim 26 wherein said first color is blue, said second color is green and
2 said third color is red.

1 28. The method of claim 27 wherein said path length G_2 is greater than path length G_1 .

1 29. The method of claim 26 wherein said first color is red, said second color is green and said
2 third color is blue.